

Sequestration: A Review of Estimates of Potential Job Losses

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October 1, 2012

Congressional Research Service
7-5700
www.crs.gov
R42763

CRS Report for Congress
Prepared for Members and Committees of Congress

Summary

Policymakers and economists have expressed concern that spending cuts and tax increases (commonly referred to as the "fiscal cliff") may push a slowly growing economy into recession in 2013. In summer 2012, policymakers particularly focused on how sequestration as delineated in the Budget Control Act (BCA) of 2011 (P.L. 112-25) might affect employment in the near term. (Sequestration refers to an automatic cancellation of a portion of federal agencies' budgetary resources.) Effective on January 2, 2013, the BCA imposes across-the-board spending cuts split about equally (in dollar terms) between the budgets of non-exempt defense and nondefense discretionary and mandatory programs, a 2% limit is placed on cuts to Medicare's budget as well.

This report reviews several studies that have estimated the potential effect of the sequestration process on employment. Their findings indicate that reduced federal spending would create or maintain fewer jobs than otherwise would have existed, and that cuts in the budgets of different agencies affect the pattern of job loss by occupation, industry, and state. These results suggest that achieving deficit reduction by means other than the BCA's about equal split of automatic budget reductions between non-exempt defense and nondefense programs might alter the composition of employers and employees most adversely affected, but the impact on total U.S. employment may be similar.

The expenditures of federal agencies create or maintain jobs in three ways. *Direct jobs* result from paying the salaries of their employees and contracting with firms in various industries (e.g., shipbuilding) to produce goods (e.g., aircraft carriers). The contractors use a portion of their federal awards to buy products from firms in other industries (e.g., navigational instruments manufacturing) that the recipients of federal funds use in their finished products. The jobs supported by the purchases of federal contractors are referred to as *indirect jobs*. When the workers in direct jobs (e.g., employees of shipbuilders) and indirect jobs (e.g., employees of navigational equipment manufacturers) spend their paychecks on final goods and services (e.g., at grocery store and doctors' offices), additional jobs are supported by federal spending. These are referred to as *induced jobs*.

One study estimated that a $48 billion sequester of Defense Department funds in 2013, compared with a baseline budget (without BCA cuts) for the calendar year, might support 907,000 fewer direct, indirect, and induced jobs. Job losses were forecast to diminish relative to the baseline after peaking in 2014 at about 1.2 million, with laid-off workers predicted to find new jobs in other industries as the economy adjusts to lower federal spending and employment recovers to the baseline forecast for 2022. Another analysis applied a 7.8% reduction to the National Institutes of Health budget for extramural awards, which are made to universities and other nongovernmental research facilities. It estimated that almost 34,000 direct, indirect, and induced job losses might result from such a program cut in FY2013. A third study, which reduced the budgets of Education Department and Head Start programs by 8.4%, put direct job loss among early childhood support personnel, elementary and secondary school educators, postsecondary faculty, and other support personnel at 80,500. Another analysis projected that a 2% reduction in Medicare's budget ($10.7 billion) in 2013, compared with a baseline budget, might support 500,000 fewer direct, indirect, and induced jobs. Of that total, almost 212,000 are direct jobs in such occupations as nurses, housekeepers, independent contractors, and medical residents.

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On January 2, 2013—absent congressional action—largely across-the-board spending cuts will be automatically imposed as stipulated in the Budget Control Act of 2011 (BCA; P.L. 112-25). The term used to describe an automatic cancellation of budgetary resources to achieve the policy goal of deficit reduction is *sequestration*. The approaching fiscal cliff[1] has led to forecasts of a possible recession in 2013,[2] and concern among policymakers about the impact of sequestration on employers and their employees.[3]

Several studies have estimated the potential effect on employment of cutting the budgets of different agencies and programs. This report reviews and summarizes this empirical research, which policymakers may take into consideration when deliberating whether to modify the BCA or enact alternative deficit-reducing legislation. Before proceeding to the review, the report briefly describes how the BCA will limit future government spending.

Future Spending Under the BCA

Congressional concern about growth of the federal deficit and debt[4] resulted in enactment of the BCA on August 2, 2011. The act reduces the budget deficit in two ways. First, it places statutory limits on the amount of most spending through the annual appropriations process from FY2012 to FY2021, and it enforces the caps through sequestration in any year in which Congress appropriates an amount greater than the discretionary spending limit for that year. Second, it creates an automatic process to reduce spending by $1.2 trillion over the FY2013-FY2021 period through a combination of sequestration and lower statutory caps on discretionary spending if the Joint Select Committee on Deficit Reduction, which was established by the BCA, does not develop and submit to Congress an alternative proposal that achieves at least equivalent budget savings. Because the committee failed to agree upon a deficit reduction plan, the sequestration process is scheduled to go into effect on January 2, 2013.

Generally speaking, the BCA would evenly split (in dollar terms) the $1.2 trillion in automatic reductions over the nine-year period between defense and nondefense spending categories. The Office of Management and Budget (OMB) is required to determine the annual amount of spending to be cut from defense and nondefense budgets after 18% attributable to debt service savings ($216 billion) is subtracted from the act's $1.2 trillion in deficit savings ($984 billion), or almost $54.7 billion from the defense and $54.7 billion from the nondefense budget functions per fiscal year from 2013 through 2021 ($984 billion divided by nine years). Within the defense and

[1] The term *fiscal cliff* describes spending and tax policy changes that would considerably reduce the budget deficit in 2013. These policy changes include not only the automatic budget cuts specified in the BCA, but also the expiration of tax cuts originally enacted in 2001 and 2003, of tax extenders (temporary tax measures that have regularly been reauthorized over the years), and of the emergency unemployment benefit program. For additional information, see CRS Report R42700, *The "Fiscal Cliff": Macroeconomic Consequences of Tax Increases and Spending Cuts*, by Jane G. Gravelle.

[2] U.S. Congressional Budget Office, *An Update to the Budget and Economic Outlook: Fiscal Years 2012 to 2022*, August 2012.

[3] On July 18, 2012, the House Armed Services Committee held hearings on *Sequestration Implementation and Options and the Effects on National Defense: Industry Perspectives*. On July 25, 2012, the chairman of the Senate Appropriations Committee on Labor, Health and Human Services, and Education, and Related Agencies released *Under Threat: Sequestration's Impact on Nondefense Jobs and Services*.

[4] The budget deficit is the amount by which spending (outlays) exceeds revenue in a given year, which is similar to the amount borrowed from the public in that year. The public debt is the sum of all past borrowing from the public.

nondefense functions, the annual amount of spending reductions must then be divided proportionally between their respective discretionary and mandatory programs. Many programs are exempt from sequestration (e.g., Social Security and Medicaid) however.[5] The BCA also limits cuts in Medicare payments to 2%. To offset this limit, the BCA requires the OMB to increase and reallocate the sequester proportionally across non-exempt non-Medicare mandatory spending and nondefense discretionary programs. In addition, the BCA allows the Administration to exempt any military personnel account if Congress is so notified by August 10. Because the OMB exempted all military accounts in letters to the Senate President and to the House Speaker dated July 31, 2012, the sequester of other defense programs must be increased uniformly to offset the exemption. The end result, as delineated in the BCA, will be spending cuts in four categories: defense discretionary appropriations, defense mandatory (direct) spending, nondefense discretionary appropriations, and nondefense direct spending.[6]

On August 1, 2012, Jeff Zients of the OMB testified that "it is impossible at this time to determine the exact amount of the reductions that will be required in any given account or program" because appropriations for FY2013 have not been enacted.[7] Members of Congress expressed their dissatisfaction with the lack of information from the Administration on implementation of the BCA by passing the Sequestration Transparency Act. President Obama signed the bill into law on August 7, 2012 (P.L. 112-155). It required the Administration to provide a detailed report to Congress on the budget accounts that will be subject to sequestration and on the percentages by which the accounts will be reduced to achieve the savings required by the BCA.

The OMB report, released in mid-September 2012, provided the following preliminary estimates of percentage reductions in FY2013: 9.4% for non-exempt defense discretionary appropriations and 10% for non-exempt defense direct spending; 8.2% for non-exempt nondefense discretionary appropriations and 7.6% for non-exempt direct spending; and 2% for Medicare. The studies examined below use reductions for 2013 that differ somewhat from those of the OMB because they were prepared before the Administration issued its report.

A Review of Empirical Estimates of the Employment Effect of Sequestration

Spending by the federal government supports (creates or maintains) jobs in three ways. It does so directly by paying the salaries of federal employees and by contracting with firms in various industries (e.g., shipbuilding) to produce final products (e.g., an aircraft carrier). Jobs supported in this way are referred to as *direct jobs*. Federal government spending also supports jobs indirectly when contractors use a portion of their federal awards to buy outputs from businesses in other industries (e.g., navigational instruments manufacturing) that are incorporated in the finished products of prime contractors. The jobs supported by (dependent on) the purchases of

[5] For more information, see CRS Report R42050, *Budget "Sequestration" and Selected Program Exemptions and Special Rules*, coordinated by Karen Spar.

[6] For more information, see CRS Report R41965, *The Budget Control Act of 2011*, by Bill Heniff Jr., Elizabeth Rybicki, and Shannon M. Mahan.

[7] U.S. Congress, House Committee on Armed Services, *Sequestration Implementation Options and the Effects on National Defense*, 112th Cong., 2nd sess., August 1, 2012.

prime contractors are referred to as *indirect jobs*. Lastly, when workers in direct jobs (e.g., federal employees and employees of shipbuilders) and indirect jobs (e.g., employees of navigational equipment manufacturers) spend their paychecks (e.g., at grocery stores and doctors' offices), additional jobs are supported by federal spending. These are referred to as *induced jobs*.

An input-output model is commonly used to provide a snapshot of these transactions (sales) between industries and ultimately, of the jobs dependent on these transactions. In this case, the model is used to trace the output by industry that results from the government (e.g., the Department of Defense, DOD) and consumers (e.g., employees of suppliers to shipbuilders and of the DOD) purchasing final products (e.g., aircraft carriers and groceries). The model expresses these transactions as the value of output supported by one dollar of spending (demand) in a given industry. Productivity factors (the ratio of employment to output) are then applied to each industry to translate the output supported by one dollar of demand to the employment supported by one dollar of demand.[8] In effect, most of the studies reviewed below applied these employment multipliers to their estimates of reduced agency spending under the BCA to calculate the approximate number of jobs by industry and state that would no longer be supported by federal purchases (i.e., projected job losses).[9]

Defense and Nondefense Department Agencies

Stephen Fuller, director of George Mason University's Center of Regional Analysis, and Chmura Economics & Analytics produced estimates for the Aerospace Industries Association of the employment effect of cuts to defense and nondefense agencies' budgets under the BCA.[10] Using the IMPLAN Pro model,[11] Fuller estimated that FY2012-FY2013 budget cuts of $115.7 billion (in nominal dollars) due to implementation of the BCA might reduce employment throughout the economy by 2.1 million jobs in FY2013.[12] Budget reductions under the BCA in the following years were estimated to result in fewer annual job losses.

[8] For more information, including the assumptions and limitations of regional input-output models, see Rebecca Bess and Zoe O. Ambargis, "Input-Output Models for Impact Analysis," Presented at the 50th Southern Regional Science Association Conference, New Orleans, LA, March 2011.

[9] Some studies include estimates of variables other than employment (e.g., national output), but only their estimates of the BCA's effect on jobs is discussed in this report.

[10] Stephen S. Fuller and Chmura Economics & Analytics, *The Economic Impact of the Budget Control Act of 2011 on DOD and Non-DOD Agencies*, Aerospace Industries Association, July 17, 2012, available at http://www.aia-aerospace.org/assets/Fuller_II_Final_Report.pdf. (Hereafter cited as Fuller, *The Economic Impact of the Budget Control Act of 2011 on DOD and non-DOD Agencies*.)

[11] IMPLAN, an economic assessment package, was used to estimate the impact of the BCA budget cuts on gross domestic product, direct labor income, and indirect and induced employment by industry sector over the FY2012-FY2013 period (cumulative) and the FY2012-FY2021 period (cumulative). Each nondefense agency's reduction in payroll (compensation) and procurement was assumed to be proportional to its distribution between the two expenditure categories in FY2010. "The DOD cutback is assumed to be the same as reported in the CRS Report [R42506, *The Budget Control Act of 2011: The Effects on Spending and the Budget Deficit When the Automatic Spending Cuts Are Implemented*.]." Procurement reductions were allocated across major industries "based on the purchasing matrix from the GSA procurement database that reflects historic procurement data (2000-2010) for each agency reported by NAICS [North American Industry Classification System] industries."

[12] "Budget levels in FY2012 are compared to budget outlays in FY2011 and for FY2013 the value of cutbacks are the differences between FY2012 and proposed budget levels for FY2013 (with BCA)." In other words, spending reductions were not derived by comparing an estimated FY2013 budget, including BCA cuts, with a baseline (status quo) FY2013 budget as was done in CRS Report R42506, *The Budget Control Act of 2011: The Effects on Spending and the Budget Deficit When the Automatic Spending Cuts Are Implemented*, by Mindy R. Levit and Marc Labonte, which Fuller (continued...)

Of the estimated 2.1 million job losses,

- 746,000 were direct jobs (277,000 federal civilian jobs and 469,000 prime contractor jobs),
- 433,000 were indirect jobs at suppliers and other firms that depend on prime contractors for business, and
- 959,000 were induced jobs (i.e., jobs throughout the economy supported by workers in direct and indirect jobs spending a portion of their paychecks).

The study estimated a small difference between the number of direct, indirect, and induced job losses due to a $56.7 billion reduction in FY2012-FY2013 in DOD spending (1,090,000) and the number of direct, indirect, and induced job losses due to a $59.0 billion reduction in spending by nondefense agencies (1,047,000). The number of induced job losses due to DOD budget cuts (482,000) also was estimated to differ little from the number of induced job losses due to budget cuts at nondefense agencies (476,000). Differences were greater in the estimation of direct job loss due to DOD budget cuts (326,000, including 48,000 civilian DOD jobs) and direct job loss due to budget cuts at nondefense agencies (421,000, including 229,000 nondefense agency jobs). Differences similarly were substantial in the estimation of indirect job loss associated with defense and nondefense budget cuts (282,000 and 151,000 jobs, respectively).

The industries estimated to experience the greatest direct and indirect job losses also differed considerably. Federal government employees could face much larger direct and indirect job losses as a result of cuts to nondefense budgets (268,000 jobs) than to the defense budget (56,000 jobs). In the private sector, employees at professional and business services firms[13] could face the largest direct and indirect job losses (180,000) due to nondefense budget cuts and manufacturing employees might incur the largest job losses (223,000) due to DOD budget cuts.[14]

Based on the FY2010 distribution of federal compensation and procurement disbursements, the model also produced estimates of potential employment effects on a state-by-state basis. The report noted, however, that "[a]ctual agency budget reductions will have a different pattern depending on how each agency chooses to absorb these cuts in their operating programs and public service requirements."[15] The areas estimated to experience the largest job losses due to federal budget cuts are California, the District of Columbia, Maryland, Texas, and Virginia. The potentially hardest hit areas differed somewhat when defense and nondefense budget cuts were examined separately. For DOD, the areas are California, Florida, Massachusetts, Texas, and

(...continued)

writes is "the principal source for the distribution of budget reductions to DOD and non-DOD agencies and their magnitudes and schedule over the FY2011-FY2021 period."

[13] The professional and business services sector is composed of businesses that provide a broad range of services to clients (e.g., computer services, consulting services, research services, administrative support and clerical services, and janitorial services).

[14] This pattern of direct and indirect job losses by industry explains the larger estimates of job losses at small businesses due to cuts to DOD than nondefense agency budgets in FY2013 (520,000 and 436,000 jobs, respectively) that are presented in a report released by the Aerospace Industries Association (AIA) in September 2012 (*The Economic Impact of Sequestration on Small Business*, available at http://secondtonone.org/wp-content/uploads/2012/09/FINAL-Small-Business-Report_Sept-20.pdf). As noted in the report, "The difference between DOD and non-DOD job losses results from the fact that the DOD reductions will have a much smaller impact on federal jobs."

[15] Fuller, *The Economic Impact of the Budget Control Act of 2011 on DOD and non-DOD Agencies*, p. 7.

Virginia; for nondefense agencies, California, the District of Columbia, Maryland, Texas, and Virginia.

Department of Defense

Inforum/University of Maryland produced estimates for the National Association of Manufacturers on the employment effect of reduced DOD spending under the BCA.[16] Using its Long-Term Interindustry Forecasting Tool (LIFT),[17] Inforum estimated that the largest adverse employment impact of cuts from 2012-2022 baseline budgets for DOD would occur in calendar years 2013 and 2014:

- A $48 billion nominal decrease (6.7%) in defense expenditures compared with LIFT's baseline budget for 2013 was estimated to reduce defense-dependent employment in the calendar year by 907,000 jobs. The total includes 152,000 direct DOD civilian (50,000) and military (102,000) positions as well as 91,000 direct jobs at defense contractors; 135,000 indirect jobs at suppliers to contractors; and 376,000 induced jobs due to reduced spending by those formerly in direct and indirect jobs.
- A $64 billion nominal decrease (8.8%) in defense expenditures compared with LIFT's baseline budget for 2014 was estimated to reduce defense-dependent employment in the calendar year by 1,211,000. The total includes 201,000 direct DOD civilian (66,000) and military (135,000) positions as well as 117,000 direct jobs at defense contractors; 176,000 indirect jobs at suppliers to contractors; and 516,000 induced jobs due to reduced spending by those formerly in direct and indirect jobs.

Job losses were estimated to decrease thereafter relative to the baseline as the economy adjusts to reduced federal spending (demand). Laid-off workers are predicted to find new jobs because, as is usual after a demand shock, spending is predicted to increase in sectors of the economy other than the federal government and overall employment is predicted to recover to the baseline for 2022.

On an industry basis, manufacturing was estimated to experience the largest job losses in absolute and percentage terms relative to the baseline forecast. Some manufacturing industries projected to initially experience job losses were also projected to experience job growth in the out-years relative to the baseline as the economy adjusts to lower government expenditures. Motor vehicle equipment manufacturing, which is consumer oriented, and construction and agricultural equipment manufacturing, which is export oriented, are two examples of this pattern provided by Inforum. In contrast, Inforum found that large direct suppliers of manufactured goods to the DOD (e.g., aerospace vehicles, ships, and specialized defense equipment) would not recoup all lost sales and jobs by the end of the projection period. Although most industries within the service

[16] Inforum/University of Maryland, *Defense Spending Cuts: The Impact on Economic Activity and Jobs*, National Association of Manufacturers, June 2012, available at http://www.nam.org/~/media/6C787C12117F49D1BDA2B6526A14DC2E.ashx.

[17] The LIFT model was used to develop a baseline (status quo) projection of the economy taking into account current and expected economic conditions as well as the projected path of defense spending adjusted for inflation similar to that presented by the Congressional Budget Office (CBO) in its January 2012 *Budget Outlook*. An alternative to the baseline scenario was then developed using the LIFT model based on CBO's estimate of the BCA's impact on defense outlays.

sector were projected to lose jobs relative to the baseline due to defense budget cuts, "once the shock of lower government spending subsides [wholesale and retail] trade, financial services and other services all have modestly higher levels of employment, compared to the baseline."[18]

Inforum used its State Employment Modeling System to allocate the above-described industry results from the LIFT model to approximate the state-by-state employment effect of projected cuts to the defense budget. It also relied on data in the 2011 version of *Projected Defense Purchases: Detail by Industry and State: Calendar Years 2010 Through 2016*, which DOD produces from the Defense Employment and Purchases Projection System (DEPPS, another Inforum economic model). In calendar year 2014, Inforum calculated that California, Texas, and Virginia would lose the most defense-dependent jobs relative to the year's baseline.

Department of Education and Head Start

The report of the National Education Association (NEA) on the size of potential job losses due to a $4.5 billion (7.8%) or $4.8 billion (8.4%) cut to Education Department (ED) and Head Start FY2013 budgets used a very different methodology from that of the other studies.[19] It confined itself to estimating the number of direct jobs that might be lost by program and state due to reduced ED and Head Start spending. Job losses might total 80,500 among early childhood personnel, elementary and secondary school (K-12) educators, postsecondary faculty, and other support personnel in FY2013, if the budget reduction for non-exempt nondefense discretionary agencies is 8.4%.[20] (Because the OMB released a preliminary percentage reduction of 8.2% for non-exempt nondefense discretionary appropriations, as stated earlier in this report, the NEA's estimates using 7.8% are not reported.)

Within the estimate of 80,500 job losses, 27,400 might occur nationally among K-12 educators. NEA derived these figures by (1) calculating from U.S. Census Bureau and other data the percentage of expenditures on K-12 education going toward employee compensation by state and the average cost per full-time equivalent employee by state, (2) applying these results to the $4.8 billion sequestration estimate noted in the preceding paragraph, and (3) aggregating state estimates to obtain a total for the nation.[21] Taking a similar approach, the NEA estimated that Head Start might incur the loss of 30,600 direct jobs.

Federal Aviation Administration

The Aerospace Industries Association (AIA) sponsored research into the impact on total U.S. employment of cuts to the Federal Aviation Administration (FAA) budget using two scenarios.

[18] Ibid., p. 13.

[19] FY2013 sequestration percentages for nondefense programs were taken from Congressional Budget Office (CBO), *Estimated Impact of Automatic Budget Enforcement Procedures Specified in the Budget Control Act*, September 12, 2011, and from Richard Kogan, *How the Across-the-Board Cuts in the Budget Control Act Work*, Center on Budget and Policy Priorities, April 27, 2012. They were applied against FY2012 funding levels because appropriations for FY2013 had not been enacted when the report was being prepared.

[20] Tom Zembar, *Impact of Sequestration on Federal Education Programs*, National Education Association, June 2012, available at http://www.nea.org/assets/docs/Impact_of_Sequestration_on_Federal_Education_Programs_Reformatted_06-26-12.pdf.

[21] NEA estimates on a state by program basis can be found at http://www.nea.org/assets/docs/Sequester_Impact_States.pdf.

The first scenario, in which an 8.5% ($1 billion) annual reduction primarily affected the agency's current operations and air transportation system, produced potential job losses throughout the economy ranging between 66,000 and 132,000 direct, indirect, and induced jobs annually through 2021.[22] The second scenario, in which the same size cut in the FAA's budget primarily affected development of the future air transportation system (NextGen), produced potential job losses economy-wide of 40,000 (direct, indirect, and induced) annually through 2020.

More specifically, the first scenario assumed that proportionally applying the FAA's budget cut across expenditure categories (two-thirds to operations, facilities and equipment, research, engineering, and development; one-third to NextGen) would reduce air passenger traffic between 5% and 10%, commercial air freight traffic between 5% and 10%, and aircraft manufacturing between 1% and 2%. Econsult, the firm that conducted this economic impact analysis, applied these constraints on the capacity of the current air transportation system to FAA estimates of the current economic impact of passenger air travel and related industry output, air freight cargo and related industry output, and aircraft manufacturing. After taking into account that individuals and firms would very likely switch to other modes of transportation and spend money on non-travel economic activities given these air capacity constraints, Econsult estimated that the FAA budget cut would result in a loss ranging from 66,000 to 132,000 direct, indirect, and induced jobs annually from 2013 to 2021.

The second scenario instead concentrated sequestration in portions of the FAA's budget affecting the nation's future air transportation system (research and development, capital equipment, and facilities). Expanding upon work previously undertaken by Deloitte that examined the costs and benefits of implementing NextGen on varying schedules, Econsult estimated that delaying implementation of a scaled down version of NextGen would result in an economy-wide net loss of 40,000 direct, indirect, and induced jobs annually from 2013 to 2020, with the job loss figure rising substantially thereafter.

National Institutes of Health

A study released by United for Medical Research, a group that advocates for increases in funding for the National Institutes of Health (NIH), estimated that sequestration of NIH extramural awards[23] to states in FY2013 would reduce employment by about 33,700 direct, indirect, and induced jobs.[24] Dr. Ehrlich developed this figure by reducing NIH awards spending in FY2011 for each state by 7.8%,[25] and then applying state-by-state employment multipliers to the amount of sequestered funds.[26] The intrastate employment multipliers for the scientific research and

[22] Econsult Corporation, *Economic Impacts of FAA Budget Sequestration on the U.S. Economy*, Aerospace Industries Association, August 2012, available at http://www.econsult.com/articles/FAA%20Sequestration%20Impact.pdf.

[23] Extramural awards fund research conducted at various universities and other non-governmental facilities.

[24] Dr. Everett Ehrlich, *Engine Stalled: Sequestration's Impact on NIH and the Biomedical Research Enterprise*, United for Medical Research, 2012, available at http://www.unitedformedicalresearch.com/wp-content/uploads/2012/07/UMR-Sequestration-Impact-on-NIH-2012.pdf.

[25] The 7.8% reduction in the program's budget is CBO's estimated cut for all nondefense discretionary spending (*Estimated Impact of Automatic Budget Enforcement Procedures Specified in the Budget Control Act*, September 12, 2011).

[26] Based on CRS comparison of statistics in *Engine Stalled: Sequestration's Impact on NIH and the Biomedical Research Enterprise* with statistics in *NIH's Role in Sustaining the U.S. Economy: A 2011 Update* (2012) by Dr. Ehrlich.

development services industry, in which the recipients of the NIH awards fall, came from the U.S. Bureau of Economic Analysis' Regional Input-Output Modeling System (RIMS II).[27] To the RIMS II multipliers for each state, Dr. Ehrlich estimated interstate jobs.[28] If NIH extramural spending patterns remain unchanged from FY2011, those states calculated to incur the largest job losses due to sequestration in FY2013 are California, Massachusetts, New York, and Texas.

Social Security Administration: Medicare

The American Hospital Association, the American Medical Association, and the American Nurses Association sponsored research on the potential effect over the FY2013-FY2021 period of a 2% reduction in the Medicare program as specified in the BCA.[29] Tripp Umbach, a consulting firm that has provided economic impact analyses for hospitals and health systems, customized the IMPLAN national model and used earlier impact studies it had undertaken for the American Hospital Association to develop baseline spending in seven industries identified as being directly affected by Medicare payments and forecast spending in those industries after the sequester.[30] Tripp Umbach analyzed CBO's March 2012 baseline for estimating the magnitude of the Medicare cuts.[31] Input-output modeling was used to estimate industry employment effects.

In 2013, a cut of $10.7 billion from the baseline was estimated to produce 500,000 fewer direct, indirect and induced jobs. Of that total, almost 212,000 were direct jobs in such occupations as nurses, housekeepers, independent contractors, and medical residents. By 2021, when the reduction in Medicare was projected to have steadily risen to $16.4 billion, job loss throughout the economy might total almost 767,000 and includes about 330,000 direct jobs. Almost one of every five direct, indirect, and induced jobs lost in both years were estimated to occur in the hospital industry. A little more than one of every five direct, indirect, and induced jobs lost were estimated to occur in the three following industries: offices of physicians, dentists, and other health practitioners; medical and diagnostic labs and outpatient and other ambulatory care services; and nursing and residential care facilities.

State-by-state projections of job loss across all industries were based on 2011 utilization data from the Kaiser Family Foundation. "Due to the fact that future utilization is not guaranteed, state-specific figures should only be viewed as rough estimates."[32] According to the research, the

[27] See *An Economic Engine: NIH Research, Employment, and the Future of the Medical Innovation Sector* (2011) by Dr. Ehrlich for these state-by-state employment multipliers. RIMS II, which resembles the subnational models of IMPLAN and Inforum, was developed and is maintained by the Bureau of Economic Analysis within the Department of Commerce. Very succinctly, RIMS II estimates how a change in economic activity in a given state (e.g., reduced purchases from the aircraft manufacturing industry in Washington state) affects output, earnings, and employment in that state.

[28] These are jobs created outside a state that must buy goods and services from other states because inputs required by a NIH award are not produced within the state where the institution receiving an award is located.

[29] Tripp Umbach, *The Negative Employment Impacts of the Medicare Cuts in the Budget Control Act of 2011*, September 2012, available at http://www.aha.org/content/12/12sep-bcaeconimpact.pdf.

[30] The industries are hospitals; nursing and residential care facilities; offices of physicians, dentists, and other health practitioners; home healthcare services; medical and diagnostic labs and outpatient and other ambulatory care services; retail stores-health and personal care; and insurance carriers.

[31] Tripp Umbach assumed a 2% across-the-board cut to all Medicare and Medicare Advantage service types, except for Medicare subsidies to low-income beneficiaries of the Part D prescription drug program because the subsidies are exempt from sequestration.

[32] Ibid., p. 14.

following states might incur the largest job losses in health care and other industries due to a 2% sequestration of Medicare funds: California, Florida, Texas, New York, Pennsylvania, Ohio, and Illinois.

Concluding Remarks

Any projections involve considerable uncertainty and thus margins for error. In this case, the specifics of how the Administration would implement sequestration were not known at the time the studies were conducted. In addition, the state-by-state job impacts of the analyses—which appeared to garner the most attention—were based on the perhaps unlikely assumption that the distribution of program spending by industry in the past would continue in the forecast period. For example, DOD might not uniformly reduce procurement across industries. Instead, it might disproportionately cut purchases of ships compared with past budgets. If so, major shipbuilding centers (e.g., Virginia and Maine) would likely be subject to larger adverse employment shocks than projected.

Cutting federal spending will result in some employers losing business and some workers losing jobs. Because sequestration is scheduled to occur while the economy is slowly recovering from the 2007-2009 recession, those firms that sell their products to the government (either directly or indirectly) might have difficulty finding other buyers in the near term and the laid-off employees of these firms might have difficulty quickly finding new jobs. Achieving deficit reduction by some means other than the BCA's about equal split of automatic budget reductions between non-exempt defense and nondefense programs might alter the composition of employers and employees who bear the burden of the cuts, but the impact on total U.S. employment may be similar.

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